

# PATENT SPECIFICATION

(11) 1 267 364

## DRAWINGS ATTACHED

- (21) Application No. 36023/68 (22) Filed 29 July 1968  
 (23) Complete Specification filed 28 July 1969  
 (45) Complete Specification published 15 March 1972  
 (51) International Classification F 16 b 21/02  
 (52) Index at acceptance E2B 13FU 5A3  
 (72) Inventor NORMAN HUGGETT



## (54) IMPROVED CONNECTION MEMBER

(71) We, HALL-THERMOTANK INTERNATIONAL LIMITED (formerly J. & E. Hall Limited) a British Company, of Regina House, 1—5 Queen Street, London, E.C.4., do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an improved connection member which has specific utility in the coupling of an air conditioning appliance to a cargo container. The invention also relates to an air conditioning appliance embodying connection members according to the invention.

It has been proposed to transport cargo in cargo containers and the International Standards Organisation (I.S.O.) have published specifications for the shape and size of such cargo containers and have specified certain fittings therefor. One feature of an I.S.O. container is that it includes standard corner castings ("I.S.O. corner castings") which facilitate the lifting of the container and these castings have been employed for coupling auxiliary equipment to the container.

Where the I.S.O. container is a "passive" refrigerated container (by "passive" is meant a container not provided with internal air conditioning equipment but which relies on being coupled to an external source of conditioned air) it has been proposed to use the I.S.O. corner castings on that face of the passive container in which the inlet and outlet air ports are provided, to secure an auxiliary air conditioning appliance in place over the ports.

This invention relates to an improved form of connection member specifically designed for engagement with a corner casting of an I.S.O. "passive" container.

According to the invention a connection member comprises a frame adapted at one end to bear against an I.S.O. corner casting and

[Price 25p]

a fastening plate insertable in one orientation relative to the casting through an opening thereof and engageable within the casting on rotation through 90°, a support rod extending substantially normal to a surface of the fastening plate and passing through said one end of the frame, the support rod being attached to a lever which can be moved between two limit positions disposed 90° apart around the axis of the support rod and thereby turn the support rod about its axis through 90° and tightening means acting on the support rod and adjustable to draw the fastening plate towards the frame.

The tightening means may comprise a cranked lever pivotally connected to the frame with a longer arm engaging a threaded member and a shorter arm pivotally connected to a movable block forming a bearing for the support rod. The cranked lever can then be pivoted in the frame to tension the support rod by turning the threaded member.

To use the connection member as described above, the fastening plate is turned into its correct orientation relative to the frame to enable the plate to be inserted into the opening of the I.S.O. corner casting, the lever is then turned to rotate the support rod through 90° to engage the plate within the casting, and the tightening means is then adjusted to draw the block away from the end plate and thus draw the fastening plate towards the frame effecting a tightening of the end of the frame of the connection member against the I.S.O. corner casting.

Alternatively, the fastening plate attached to the support rod passes through a tubular sleeve portion of the frame, the support rod being rotatable through 90° (to turn the fastening plate by a lever passing through a slot in the sleeve and movable axially in the sleeve by means of a tightening nut threaded onto that end portion of the support rod remote from the fastening plate. Preferably the nut is rotat-

ed by a tightening arm pivotally attached to the nut (e.g. a bar attached to the nut via a universal joint).

5 An air conditioning appliance comprising a parallelepipedic frame which supports air conditioning equipment and includes a connection member, as hereinbefore defined, at at least some of the corners of the frame, constitutes a further aspect of the present invention.

10 One embodiment of connection member in accordance with the invention will now be described, by way of example, with reference to the drawing accompanying the provisional specification which shows a schematic perspective view of the connection member.

15 Referring to the drawing, the connection member comprises a frame 1 have an apertured end plate 2. Extending through the aperture in the end plate 2 is a support rod 3 mounting at one end a substantially oval fastening plate 4, and extending substantially normal to a surface of the plate 4.

20 The support rod 3 passes through a block 5 and is attached to a lever 6 which can be set in the limit position shown in the drawing or can be rotated through 90° about the axis of the support rod 3. Spring means (not shown) are provided within the block 5 to draw the lever 6 into close engagement with the adjacent surface of the block 5 and to bring a projection on the lever into engagement with a detent in the block. Two detents are provided, one corresponding to each limit position of the lever.

30 The block 5 is pivotally attached adjacent to one end of a shorter arm of bifurcated cranked lever 7 which is itself pivotally mounted within the frame 1. The end portion of a longer arm of the cranked lever 7 remote from the block 5 is provided with a slot 8 through which a threaded member 9 passes. An adjusting knob 10 is provided on the upper end portion of the threaded member 9, the lower end portion threadedly engaging a threaded collar 11 pivotally mounted below the frame 1 about a pivoting axis parallel to the pivoting axis of the cranked lever 7 to the frame 1.

45 To couple the connection member to an I.S.O. corner casting, the fastening plate 4 is inserted into the substantially oval opening in the corner casting and the lever 6 is turned through 90° to engage the fastening plate with the casting. The adjusting knob 10 is now turned to force the longer arm of the cranked lever 7 towards the frame 1 and concomitantly draw the block 5 away from the end plate 2. This draws the opposite surface of the end plate hard against the facing surface of the I.S.O. corner casting.

60 From what has been said, it will be appreciated that a connection member in accordance with the invention employs a two stage coupling process, a first stage in which the fastening plate 4 is secured in position in the I.S.O.

casting and a second stage in which the connection member is tightened in place. This two stage coupling process has particular advantages in practice when the connection member is used for attaching an air conditioning appliance to an I.S.O. container. If the air conditioning appliance embodies gaskets on that face confronting the face of the I.S.O. container (which gaskets serve to couple supply and return ducts of the air conditioning equipment to the inlet and outlet ports of the container), there is far less danger of damage to the gaskets and a far more sensitive control over the tightening of the air conditioning appliance in place, if a connection member according to the present invention is employed.

70 Preferably, an air conditioning appliance in accordance with the invention would include a connection member as hereinbefore defined on each of the four corners of one side of a parallelepipedic frame, the procedure being to first secure the four fastening plates in the four I.S.O. corner castings and then to tighten the connection members one by one to ensure even compression of the gaskets, between said one side of the frame and an end of the I.S.O. container.

85 A modified form of coupling member (not illustrated) replaces the block 5 by a tubular sleeve through which the support rod 3 passes and replaces the threaded member 9, adjusting knob 10 and cranked lever 7 by a nut threaded on the end portion of the support rod 3 remote from the fastening plate. The nut is rotated relative to the support rod 3, to move the latter axially within the sleeve, by a tightening arm pivotally attached to the nut by a universal joint. To allow for the required 90° rotation of the support rod 3, the lever 6 (secured to the support rod intermediate its ends) passes through a circumferentially directed slot in the sleeve, and to allow for axial movement of the support rod in the sleeve (when the nut is tightened thereon), that end portion of the slot which is occupied by the lever 6 when the fastening plate 4 is in the orientation required for fastening it into the I.S.O. corner casting, is extended axially of the sleeve in the direction away from the end plate 2. The slot therefore has an "L" shape with one axially and one circumferentially directed arm.

#### WHAT WE CLAIM IS:—

1. A connection member comprising a frame adapted at one end to bear against an I.S.O. corner casting and a fastening plate insertable in one orientation relative to the casting through an opening thereof and engageable within the casting on rotation through 90°, a support rod extending substantially normal to a surface of the fastening plate and passing through said one end of the frame, the support rod being attached to a lever which can be moved between two limit positions disposed 90° apart around the axis of the support rod and thereby turn the support rod about its axis

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through 90° and tightening means acting on the support rod and adjustable to draw the fastening plate towards the frame.

- 5 2. A connection member as claimed in claim 1, in which the tightening means comprises a cranked lever pivotally connected to the frame of the connection member with a longer arm of the cranked lever engaging a threaded member and a shorter arm pivotally connected to a movable block forming a bearing for the support rod.

- 10 3. A connection member as claimed in claim 1, in which the tightening means comprises a nut threadedly engaging an end portion of the support rod, the nut bearing against a tubular sleeve through which the support rod passes, the nut being rotatable relative to the support rod by a tightening arm pivotally at-

tached to the nut, the lever passing through a slot in the sleeve.

4. A connection member substantially as hereinbefore described with reference to, and as illustrated in the drawing accompanying the provisional specification.

5. An air conditioning appliance for an I.S.O. container comprising a parallelepipedic frame supporting air conditioning equipment and including a connection member, as claimed in any preceding claim at four corners of the frame.

J. Y. & G. W. JOHNSON,  
Furnival House,  
14-18, High Holborn,  
London, W.C.1,  
Chartered Patent Agents,  
Agents for the Applicants.

1267364

PROVISIONAL SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

